Steep Falls Quadrangle, Maine

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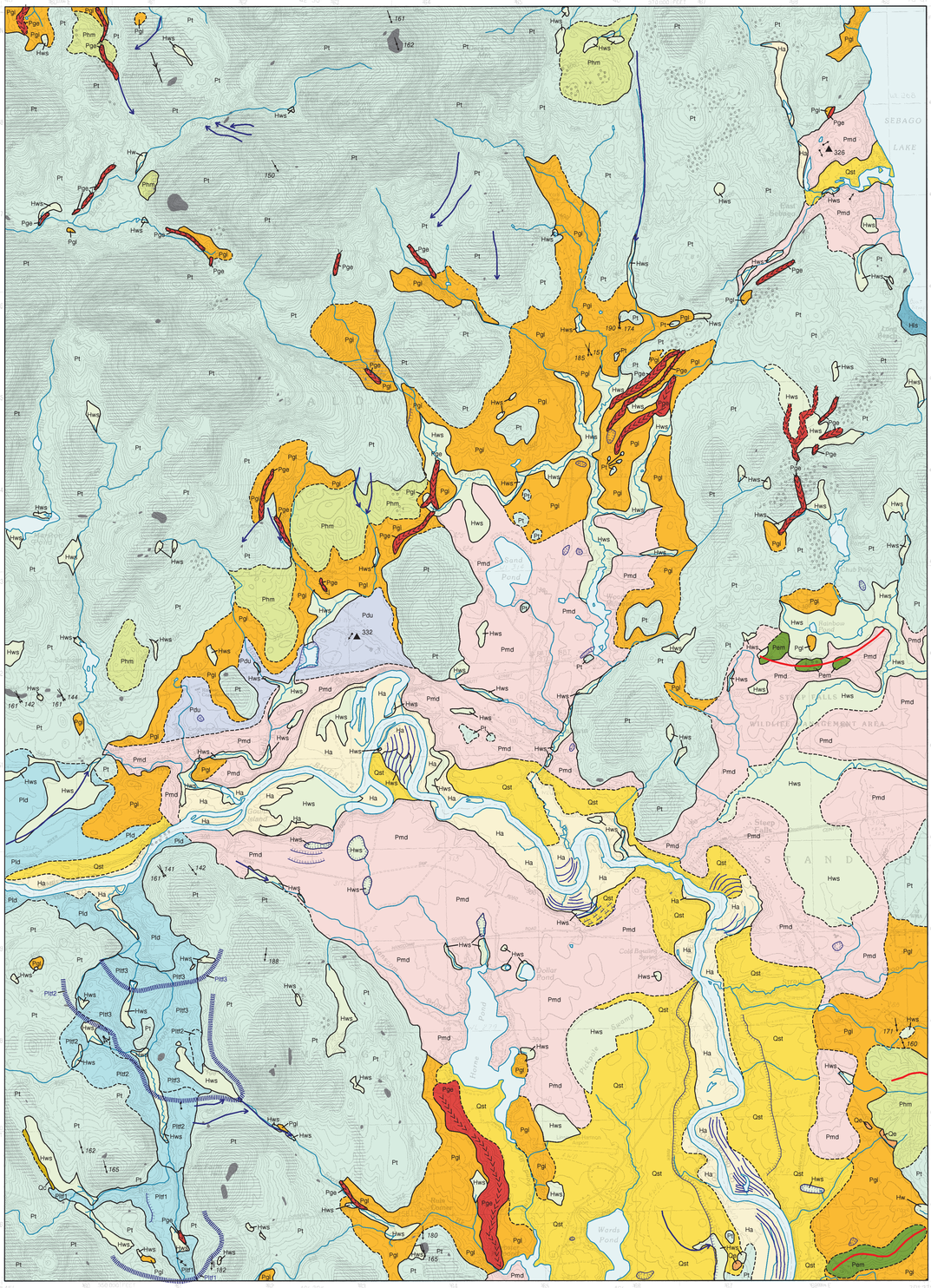
For additional information,
see Open-File Report 99-133.

Surficial Geology



SOURCES OF INFORMATION

Surficial geologic mapping by John C. Gosse and Woodrow B. Thompson completed during the 1994 field season; funding for this work provided by the U. S. Geological Survey COGEOMAP program. Geologic unit designations and contacts revised and matched to adjacent quadrangles in 1999 by MGS geologists.

Quadrangle Location

SCALE 1 : 24,000

1 0 1 MILE
1000 0 1000 2000 3000 4000 5000 6000 7000 FEET
1 0 1 KILOMETER

CONTOUR INTERVAL 10 FEET

TRUE NORTH

Topographic base from U.S. Geological Survey Steep Falls quadrangle, scale 1:24,000 using standard U.S. Geological Survey topographic map symbols.

The use of industry, firm, or local government names on this map is for location purposes only and does not impute responsibility for any present or potential effects on the natural resources.

Ha **Alluvium** - Generally well-sorted and stratified sand, silt, and gravel deposited by modern rivers and streams.

Hls **Lake shoreline deposits** - Postglacial sediments deposited on past or present shorelines of Sebago Lake. Composed of fine to coarse sand. Map unit also includes some artificial fill, boulders, and bedrock outcrops.

Hw **Hws** **Wetland deposits** - Poorly drained areas with variable tree cover, commonly associated with standing water. Materials may include clay, silt, peat, or muck. Till or bedrock may occur locally. Hw: wetlands, undifferentiated. Hws: swamp. This unit also includes some marshland and heaths.

Qst **Stream terrace deposits** - Sand and gravel deposits and erosion surfaces on former flood plains of the Saco River and Stony Brook. Formed when these streams flowed at higher levels than present.

Qe **Eolian deposits** - Typically well-sorted sand. Deposited by wind action in late-glacial or postglacial time.

Qc **Colluvium** - Poorly sorted debris, derived mainly from glacial till and moved down slopes by gravity.

Pld **Glaciolacustrine delta** - Sand and gravel deposited in a glacial lake in the Saco Valley.

Pltf3 **Pltf2** **Pltf1** **Glacial Lake Town Farm deposits** - Sand and gravel deposited in a glacial lake that existed when glacial ice dammed the Back Brook valley west of Town Farm Hill, preventing lake from draining northward. Includes deltaic, subaqueous fan, and lake-bottom deposits. Numbers refer to the lake stages (1 is highest and oldest) into which the successive units were deposited as the ice margin receded.

Pdu **Delta of uncertain origin** - Sand and gravel deposited in a water body on the north side of the Saco Valley. It is not known whether this delta formed in a lake or the ocean.

Pmd **Glaciomarine delta** - Sand and gravel deposited in the ocean by glacial meltwater streams. The deltas have generally flat tops (locally interrupted by kettles and gullies), and consist of gravelly topset beds (glacial stream deposits) overlying inclined sandy foreset beds deposited on the advancing delta front.

Pgi **Ice-contact deposits** - Gravel and sand deposited near the glacier margin.

Phm **Hummocky moraine** - Massive to stratified, poorly sorted diamict (till) with variable percentage of gravel and sand. Characterized by knobby topography, many boulders, and a loose sandy matrix.

Pem **End moraine** - Ridges of till or sand and gravel deposited at the glacier margin.

Pge **Esker** - Ridges of massive to stratified, commonly interbedded, sand and gravel. Deposited by meltwater streams in subglacial and englacial conduits during retreat of the last ice sheet.

Pt **Till** - Homogeneous to weakly stratified, locally compact, sandy sediment deposited directly from glacial ice. Very stony in places. Particle sizes range from silt, sand, and minor clay to large boulders.

Bedrock - Gray areas are individual outcrops. Ruled pattern indicates areas where surficial sediments are generally less than 2m thick and where bedrock outcrops are common.

Boulders - Areas of numerous large boulders.

Contact - Boundary between map units. Dashed where location is uncertain or inferred.

Ice margin position - Inferred position of the glacier margin during deposition of the indicated map unit.

Scarp - Hachured line indicates break in slope resulting from stream erosion.

Meander scrolls - Linear traces of former stream channels on past or present flood plain of Saco River.

135 **Ice-flow indicator** - Arrow with dot indicates glacially striated bedrock. Dot marks the point of observation; number is azimuth (in degrees) of ice flow direction. Flagged direction is older. Barbed line shows direction of ice flow inferred from crescentic marks or stoss-and-lee erosional features.

End moraine - Line indicates axis of end moraine.

▲350 **Delta elevation** - Number indicates surveyed elevation (in feet) of contact between topset and foreset beds in the delta, which marks elevation of former sea or lake level to which the delta was graded.

Paleocurrent direction - Average dip direction of cross bedding (including foreset beds in deltas) in sand or gravel. Indicates direction of flow of glacial meltwater. Dot marks point of observation.

>>>>> **Esker ridge** - Shows trend of sand and gravel ridge deposited in a meltwater tunnel within or beneath glacial ice. Chevrons indicate direction of meltwater flow.

Kettle - Depression created by melting of buried glacial ice and collapse of overlying sediments.

Meltwater channel - Channel eroded by glacial meltwater stream or postglacial stream in unit Qst. Typically steep-sided.

Fluted till surface - Symbol shows axis of a narrow ridge carved in till by flow of glacial ice.

USES OF SURFICIAL GEOLOGY MAPS

A surficial geology map shows all the loose materials such as till (commonly called hardpan), sand and gravel, or clay, which overlie solid ledge (bedrock). Bedrock outcrops and areas of abundant bedrock outcrops are shown on the map, but varieties of the bedrock are not distinguished (refer to bedrock geology map). Most of the surficial materials are deposits formed by glacial and deglacial processes during the last stage of continental glaciation, which began about 25,000 years ago. The remainder of the surficial deposits are the products of postglacial geologic processes, such as river floodplains, or are attributed to human activity, such as fill or other land-modifying features.

The map shows the areal distribution of the different types of glacial features, deposits, and landforms as described in the map explanation. Features such as striations and moraines can be used to reconstruct the movement and position of the glacier and its margin, especially as the ice sheet melted. Other ancient features include shorelines and deposits of glacial lakes or the glacial sea, now long gone from the state. This glacial geologic history of the quadrangle is useful to the larger understanding of past earth climate, and how our region of the world underwent recent geologically significant climatic and environmental changes. We may then be able to use this knowledge in anticipation of future similar changes for long-term planning efforts, such as coastal development or waste disposal.

Surficial geology maps are often best used in conjunction with related maps such as surficial materials maps or significant sand and gravel aquifer maps for anyone wanting to know what lies beneath the land surface. For example, these maps may aid in the search for water supplies, or economically important deposits such as sand and gravel for aggregate or clay for bricks or pottery. Environmental issues such as the location of a suitable landfill site or the possible spread of contaminants are directly related to surficial geology. Construction projects such as locating new roads, excavating foundations, or siting new homes may be better planned with a good knowledge of the surficial geology of the site. Refer to the list of related publications below.

OTHER SOURCES OF INFORMATION

1. Gosse, J. C., and Thompson, W. B., 1999, Surficial geology of the Steep Falls 7.5-minute quadrangle, York and Cumberland Counties, Maine: Maine Geological Survey, Open-File Report 99-133, 23 p.
2. Gosse, J. C., and Thompson, W. B., 1998, Surficial materials of the Steep Falls quadrangle, Maine: Maine Geological Survey, Open-File Map 98-190.
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4. Thompson, W. B., 1979, Surficial geology handbook for coastal Maine: Maine Geological Survey, 68 p. (out of print)
5. Thompson, W. B., and Borns, H. W., Jr., 1985, Surficial geologic map of Maine: Maine Geological Survey, scale 1:500,000.
6. Thompson, W. B., Crossen, K. J., Borns, H. W., Jr., and Andersen, B. G., 1989, Glaciomarine deltas of Maine and their relation to late Pleistocene-Holocene crustal movements, *in* Anderson, W. A., and Borns, H. W., Jr. (eds.), Neotectonics of Maine: Maine Geological Survey, Bulletin 40, p. 43-67.